

Hanli Zhang

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Summary

Robotics engineer with hands-on experience developing, integrating, deploying, and debugging real robotic systems across mobile and aerial robotics and human-robot interaction. Strong in **state estimation, localization/SLAM, sensor fusion, planning/control, perception, C++/Python, ROS, simulation, and real-system debugging**.

Languages: C/C++, Python (PyTorch, JAX) **Robotics:** ROS1/2, SLAM, Localization, Mapping, State Estimation, Sensor Fusion **Planning & Control:** Optimal Control, Motion Planning **Perception & Deployment:** OpenCV, ONNX/TensorRT **Simulation & Tools:** MuJoCo, Gazebo, Linux, Docker, Git

Work Experience

Suzhou Beacon Robot Technology Co., Ltd.

Algorithm Engineer

Suzhou, China

May 2021 - Aug 2022

- Improved an AGV **SLAM/localization stack** using LiDAR-IMU-odometry fusion, SVD, particle filtering, and Kalman-filter sensor fusion, achieving **+/-5 mm pose accuracy** and **30% fewer pose-loss events** in cluttered environments.
- Refactored **12 ROS/C++ infrastructure modules** and resolved **30+ field issues** through rosbag/log-based diagnosis, communication-error handling, sensor/system integration debugging, and repeated real-robot testing.

LYF Innovation Ltd., Inc.

Robotic Engineer Intern

Philadelphia, PA

May 2023 - Sep 2023

- Built a **VINS-Fusion visual-inertial state-estimation pipeline** integrating panoramic camera and IMU data with RANSAC-based geometric filtering, reducing outdoor tracking error by **15%** on a robotic mower.
- Improved robotic-mower perception accuracy by **10%** through dataset curation, annotation cleanup, and failure-case analysis, strengthening data quality for model evaluation and iteration.

École Polytechnique Fédérale de Lausanne (EPFL) - LASA

Doctoral Assistant in Robotics

Lausanne, Switzerland

Nov 2024 - Apr 2026

- Teaching assistant in Machine Learning; conducted research in **human-robot interaction and multi-limb coordination** using human motion data.
- Developed a **dynamical-systems-based modeling framework** for coordination analysis and stable coupled motion primitives; [report](#).

Selected Robotics Projects

Drag-Aware Quadrotor Planning & Sim-to-Real Validation

GRASP Lab - Vijay Kumar, Nikolai Matni

University of Pennsylvania, 2023-2025

- Trained a 3-layer MLP on **200,000 simulated trajectories** and integrated the learned drag cost into trajectory optimization with an SE(3) controller, achieving **83% lower tracking error** in simulation and **49% fewer crashes** on Crazyflie hardware; [paper](#); [code](#).

F1TENTH Depth-Based Navigation

xLAB - Rahul Mangharam

University of Pennsylvania, 2023

- Built a monocular-depth perception/navigation stack by benchmarking depth models, integrating MiDaS, **rangefinder calibration**, and depth-guided Follow-the-Gap control; deployed optimized ONNX/TensorRT inference at **40 FPS on Jetson Xavier NX**; [code](#); [report](#).

Gaussian Splatting SLAM with Loop Closure

ESE 6500 Learning in Robotics

University of Pennsylvania, 2024

- Extended **MonoGS** with loop closure, Gaussian-aware covisibility, and pose-graph optimization; implemented global bundle adjustment and CUDA rasterizer visibility metrics, reducing **ATE RMSE by up to 23%** over the MonoGS baseline on tested TUM RGB-D sequences; [report](#).

LLM-Based Task Planning & Evaluation for Robotics

LASA - Aude Billard

EPFL, 2025-2026

- Supervised and evaluated an **LLM-based manipulation planner** with structured action primitives, feedback/recovery logic, and retune-vs-replan decisions; achieved **85% success over 20 trials** and analyzed sequencing and environment-state failures; [report](#).

Education

University of Pennsylvania

M.S. in Electrical Engineering

Philadelphia, PA

Sep 2022 - May 2024

- Coursework: Machine Learning, Reinforcement Learning, AI, Optimization.

Qufu Normal University

B.S. in Mathematics

Shandong, China

Sep 2017 - May 2021